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EDITORIAL DEPARTMENT NOTE

Accounting for fixed assets is a many-sided problem. First there is the valuation side, the matter of deciding on what basis fixed assets shall be valued at date of acquisition and at each balance sheet date throughout their lives as they depreciate and become obsolete. Secondly, there is the cost side, the spreading of the investment in fixed assets over production as a charge for depreciation and obsolescence. In addition, and by no means of subsidiary importance nowadays, there is the income tax side, the matter of accounting for fixed assets and their use in such a way as to accord with tax regulations and at the same time not lose any offset against profit to which the taxpayer is rightfully entitled. Since the issuance of T.D. 4422 and mimeograph 4170 a few years ago, there has been an appreciable improvement in fixed asset accounting, particularly with respect to detailed plant ledgers and the control of depreciation. At the present time there seems to be an increased interest in the use or production basis for calculating depreciation, as contrasted with the straight-line basis. This increased current interest can no doubt be traced to the present low rate of industrial production and an effort to bring fixed charges more in line with output. At the same time the problem of obsolescence in its relation to depreciation continues to be a vexing one as the rate of change in product styles, production methods and the advent of new products renders equipment obsolete before it has been entirely depreciated on a "wear and tear" basis. The two articles in this issue of the Bulletin will be found most helpful in providing an approach to these important present-day problems.

The author of our first article should need no introduction to our members as he has frequently contributed to the N.A.C.A. Bulletin and has appeared as a speaker before many of our chapters. Victor H. Stempf entered the field of public accounting with Touche, Niven & Co. following his graduation from St. Louis University in 1915 and became a member of the firm in 1920. He assumed his present position in the New York office of his firm in 1927. From 1920 to 1923 he served as instructor in auditing and accounting at St. Louis University. A charter member of the St. Louis Chapter, Mr. Stempf served as its Vice President before moving to New York. During 1933-34, he served as President of the New York Chapter, and for the past three years has been a member of the National Board. Mr. Stempf is a C.P.A. of Missouri, New York and Michigan, and a member of the American Institute of Accountants and the New York Society of C.P.A.'s.

Our second article is by John S. Learoyd, Jr., who is Assistant Treasurer of the Hygrade Sylvania Corp., Salem, Mass. Following his graduation from Dartmouth College in 1911, Mr. Learoyd spent two years in the employ of Harvey S. Chase & Co. and the Old Colony Trust Co., and four years with the Stone and Webster Management Association. In 1916, he entered the accounting department of the Hygrade Sylvania Corp., was later promoted to the position of Controller and then Assistant Treasurer, the position he now holds. Mr. Learoyd has been a member of the Association for the past fifteen years.

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NATIONAL ASSOCIATION OF
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APRIL 15, 1938

ACCOUNTING FOR FIXED ASSETS

By Victor H. Stempf, Resident Partner,
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IN DISCUSSING the basis of stating the amount of fixed assets, one cannot avoid the related subject of depreciation. The difficulty, if any, lies not in finding enough to talk about, but in selecting a few related phases of the subject. The abundant literature on public utility rate making, and the decisions of state and federal courts and commissions concerning utilities indicate the highly provocative character of the subject.

Early Developments in Fixed Asset Accounting

During my own apprenticeship, in the Middle West depreciation was still very largely an academic question except in the largest and most progressive businesses. One argued constantly that depreciation was a fixed element of expense, and was always met with the response that physical deterioration was more than compensated by appreciation of land, and with similar arguments that are greeted with derision today. Most businesses provided depreciation sporadically, if at all, and usually only to the extent that profits could bear the charge. Consistency of method and the useful life of assets were disregarded. The establishment of sounder bases of fixed asset accounting was a crusader's job, the brunt of the battle being borne by accountants in both private and public practice.

The advent of income taxes in 1913, followed rapidly by the heavy war-time taxes, gave new impetus to the adoption of sound accounting methods, and particularly recognition of depreciation as an unavoidable factor of profit and loss. The birth of N.A.C.A. brought added strength to the crusaders, and the Association has contributed much to the transition and development of the practical application of these principles in our modern industrial accounting.

When I began to gather my notes for this talk, I recalled that Frederick G. Colley had prepared an article on "Depreciation of

Manufacturing Plants" in 1915. I found a copy of the article, in which he said:

> The necessity for the accurate determination of the depreciation charge is most important in a manufacturing plant, * * * having regard to its direct bearing upon the true cost of the product and the proper computation of competitive selling prices. In a corporation which is subject to the transfer of holdings, it is of utmost importance that the depreciation charge be on such a basis as will protect future stockholders from the necessity of extraordinary charges against revenue to replace the exhaustion of capital values which should have been currently and regularly provided.

In the same paper twenty-three years ago, the maintenance of detailed plant ledgers was advocated, as follows:

> In a properly organized factory, it is neither relatively costly nor inconvenient to provide means for a constant and current record of plant assets. Such a record, preferably on cards, should provide the best possible vehicle in determining the proper charge for depreciation. It should be ascertained that no fictitious or extravagant values have been introduced and that such expenditures, both in prime cost and installation or incidental cost, represent capital invested with reasonable prudence and foresight. Experiments in design or installation which proved to be unwise, and were not adopted, should form no part of the capital value subject to depreciation. They become an immediate charge against revenue. The expected efficient life of a plant item, while often capable of varied demonstration from different points of view, should be determined largely by the local and particular conditions surrounding the business.

These are statements to which we may still say "Amen" in 1938.

Two important reasons should impel management to obtain an accurate, current, and detailed record of fixed assets: first, the unquestionable importance of depreciation in the determination of costs and sales price policy; and second, the equally important aspect of proper disclosure of material fact in the representations made by management in the financial statements of the business. The membership of N.A.C.A. is thoroughly conversant with the relationship of depreciation to cost accounting. This presentation deals more particularly with the financial aspects of the subject in relation to industrial companies and ignores the special problems of utilities.

Incidentally, it is interesting to observe that the manual of accounting procedure promulgated by the Federal Power Commis-

sion, effective January 1, 1937, states that provision for depreciation must be made. Some utilities continue to argue that the conventional, utility retirement reserve basis *does* provide for depreciation, but the consensus among practicing accountants denies this assumption. True enough the one flows from the other, in that most assets are replaced at the time of retirement, but depreciation seeks to account for past investment, not to provide for future expenditure.

The Basis of Stating the Amount of Fixed Assets

An accurate record of the investment in fixed assets, stated on a proper basis, is the foundation of the subject, and there remain in the financial reporting of industrial companies, many variations and apparent inconsistencies. There are modern schools of thought which center principally around concepts of stating fixed assets at (a) sound reproduction cost, and (b) realizable value.

The practical accountant, with his nose to the grindstone of current commercial practice, toys with these ideas, does not necessarily reject them, but still has plenty of problems to solve in applying consistently the conventional principle of stating fixed assets on the basis of acquisition cost less accrued depreciation. He recognizes depreciation as the amortization of the investment in fixed assets over the useful life of such property, the unamortized portion representing the future service to be rendered by such assets. This concept is analogous to that usually accorded prepaid expenses and similar items. Depreciation is not the opposite of appreciation in the sense that appreciation is irregular and capricious. Depreciation is inevitable and reasonably regular. Although physical deterioration is one of the obvious causes of depreciation, the life of an asset may be decidedly less than its inherent physical life. Depreciation also contemplates wear and tear, obsolescence, and inadequacy. Additional time will be given these phases of the subject later. Meanwhile, what do we mean when we speak of the investment in fixed assets?

"Cost" of Fixed Assets

Fixed assets may have been acquired partly for cash, partly for stock, or as a part of a mixed aggregate of assets for an upset consideration of cash or stock, or both. The stock issued by the

purchases may have borne a par value or may have been of no par value. If the latter, it may have had an assigned value at time of issuance, or a minimum stated value. The value assigned to fixed assets acquired for stock may have been based upon appraisal of the assets at the time of acquisition, but it is much more likely that the amount adopted for the fixed assets may have been arbitrarily based upon the par value, minimum stated value, assigned value, perhaps upon book or even market value at the time of issuance of such stock. When we get into consolidations, we may have a total of unlike amounts, to all of which accepted practice has blithely shut its eyes under the generic term of "cost." In the interests of sound practice and the adequate disclosure of material fact (now made imperative by the S. E. C.), the term "cost" should be used with care in describing fixed assets. Clearly, it is correct in the case of assets acquired for cash; but it should be carefully qualified when considered in connection with assets acquired for stock.

It should be pointed out that the principle of consolidations contemplates the combination of the figures of constituent companies as if they were all one company. In other words, it seems that the circumstances of the acquisition of the subsidiaries by the parent should control the basis of stating the amounts of assets of each subsidiary in the consolidation, as opposed to the theory that the consolidation should reflect a summarization of the cost of assets to the respective constituent companies. The latter hypothesis does not appear to be consistent with the single-company theory. It follows that cost to the subsidiary is cost to the consolidated group, only if the expenditure occurred subsequent to the acquisition of the subsidiary by the parent.

Take the case of a company which buys land for $100,000 in cash and a building thereon for $500,000 in cash. Some years later the company is sold to another corporation for $1,000,000 in cash, and the subsidiary has no assets other than the land and building. From a consolidated standpoint it would seem incongruous to state the amount of such assets at the cost to the subsidiary. In buying the stock of the subsidiary, the parent acquired land and building which the parent considered worth $1,000,000. In fixing the price of $1,000,000, the buyer determined by disinterested appraisal that the value of the land was $250,000 and that of

the building $750,000. Does it not follow, on a consolidated basis that the income statement of the group should include depreciation on the $750,000 value of the building and not on the subsidiary's cost of $500,000? The same problem presents itself time and time again in the case of a single company acquiring fixed assets for stock, or in purchasing the mixed aggregate assets of some other company, although not through the medium of buying the capital stock of such company. The cost or other basis of fixed assets appearing on the books of the seller, probably has no relation to the utility of such assets to the purchaser. Appraisal at time of acquisition is obviously indicated if one would approach the question from the standpoint of ascertaining the facts accurately.

The term "appraisal" is not restricted to the commonly accepted meaning of that term, i.e., "sound value" (replacement cost less observed depreciation), although that basis might be pertinent. The term relates primarily to utility in the sense of the price which a purchaser would willingly pay were he not influenced by related intangible values. A building may have cost $1,000,000; the seller may be willing to let it go for $750,000; but if the purchaser cannot make money through its use if he pays more than $500,000, then $500,000 is all that he will pay. Such should be the appraisal viewpoint with respect to property acquired in a mixed aggregate of assets or when acquired for stock. Similarly, that should be the basis of revaluing properties in reorganizations of businesses floundering under the load of excess facilities or those purchased at excessively high levels. It may be impracticable, if not impossible, in many cases to restate historical book amounts of fixed assets on this basis, but one should be wary of describing the basis as "cost" under such circumstances without qualification, unless the facts are unassailable.

Factors of Taxation Complicate the Problem

The aforementioned problems in determining fairly the amount of the investment in the fixed assets of a business, are not simplified by factors of taxation. On the contrary, federal income taxation has beclouded the issues, and has reared unsound barriers to the solution of the problems. Too many managements, and likewise accountants, permit tax attitudes to color their reasoning and distort the application of sound principles of accounting.

I strongly believe that provisions for depreciation, generally speaking, have been far too low for many years, with the far-reaching economic effect commonly overlooked. Technological improvements in productive machinery have come much faster than it has been possible to assimilate them. A substantial portion of investment must be recovered before business can afford to scrap the old and put on the new. Managements with real vision recognize this factor of obsolescence and accelerate amortization of facilities as far beyond the ordinary bounds of the useful life theory as may be possible in the light of competitive prices, financial policy, and tax deterrents.

The hazards of industrial enterprise are entitled to liberal reward, and without the inducement of such reward industry stagnates. One may as well buy tax-free securities and go fishing, as to roll the dice on a table where the House takes eighty per cent of the winnings. The sponsorship of most of our present Utopian legislation which seeks to hasten the more abundant life ignores this factor in too large a degree. Putting industry in a straitjacket jeopardizes immeasurably the employment of our industrial workers, defeating the very object of such legislation.

A sound long-range program of federal income taxation should bear in mind that business is not here today and gone tomorrow unless harassed and taxed to the point of diminishing returns. Definite liberalization of depreciation allowances should be fostered within reasonable limits of consistent practice and sound accounting and engineering bases. "Let's look at the record!"

Treasury Decision 4422

In 1934, when the Ways and Means Committee of the House was making its studies preliminary to the introduction of a new tax bill, attention was directed to the importance of the deduction allowed taxpayers for depreciation. The Committee proposed, merely as a revenue expedient, the arbitrary reduction by 25 per cent of the allowance for depreciation and depletion. Secretary Morganthau objected to this proposal and suggested that the purpose be accomplished by indirection though administrative action. The Secretary informed the Committee that the Treasury Department Regulations had theretofore provided that:

> While the burden of proof must rest upon the taxpayer to sustain the deduction taken by him, such deductions will not be disallowed unless shown by clear and convincing evidence to be unreasonable.

Acting under these provisions the Bureau of Internal Revenue had attempted to check the depreciation deductions claimed by taxpayers by having its field agents prepare detailed depreciation schedules. Thus, the Bureau was loaded with a large volume of preliminary work and was forced to assume the burden of proving "by clear and convincing evidence" that the taxpayer's claims were unreasonable. The Secretary indicated that the Department proposed to overcome these administrative disabilities by making the following changes:

1. Amending the regulations to place the burden of proof upon the taxpayer.
2. Requiring taxpayers to submit the detailed depreciation schedules theretofore prepared by revenue agents.
3. Limiting depreciation deductions to such amounts as might reasonably be necessary to recover during the remaining useful life of any depreciable asset, the unrecovered basis of the asset.

This was the background of the much discussed T.D. 4422, approved by the Secretary of the Treasury on February 28, 1934. Shortly thereafter, mimeograph 4170 was issued by the Commissioner of Internal Revenue, setting forth the information which would be asked of taxpayers in support of depreciation claimed. Voluminous information was required and considerable uneasiness prevailed among taxpayers concerning their ability to sustain the burden of proof. Those who had plant ledgers had no great difficulty in preparing the schedules. Some who did not have detailed plant accounts, and to whom the depreciation deduction was a material factor, hastened to prepare the necessary analyses from which such records could be established. Others awaited the demand. In many cases compliance has not been compelled. The initial creation of the record is, of course, in many cases, a real task involving substantial cost. Once established, the burden of maintaining the records is reasonable.

Results of T.D. 4422

To the extent that T.D. 4422 had the effect of stimulating the creation of detailed plant records, it is to be highly commended.

From the revenue standpoint, it cannot be stated how the requirement has worked out. Too short a period has since elapsed, and only the Treasury Department has available the complete data from which sound conclusions could be drawn. However, the following tentative conclusions and personal opinions may be expressed:

1. The Bureau has assuredly been relieved of a heavy task by shifting the job to the taxpayer. The taxpayer is in a better position to do the work; the records are his own. The Department cannot be criticized for this change.
2. I doubt whether T.D. 4422 has raised any considerable part of the additional revenue promised by the Secretary through a stricter administration of the depreciation section of the law. Contact with varied cases indicates that moderately higher taxes resulted in some, but in many cases no change was effected. In a few, the taxpayer may derive a real advantage from reduced depreciation allowances, by the deferment of related charges into later, higher tax years.
3. Taxpayers who made liberal provision for depreciation in prior years have had some drastic reductions inflicted upon them for tax purposes. For example, a taxpayer who has been depreciating a well-constructed building for twenty years on a thirty-year life, might have the remaining life estimated by the department at twenty years, not ten. This would result in a fifty per cent reduction in allowable depreciation unless the taxpayer can produce convincing evidence that the remaining life will be less than twenty years.
4. Taxpayers are being denied retirement losses where the asset abandoned is one of a group of mixed assets depreciated over an average life. This position of the Department seems justified in respect of normal retirements.

There are, of course, many cases of depreciation still in dispute, but T.D. 4422 is no longer a matter of paramount importance in the lives of most taxpayers. The initial work of analyzing fixed assets by years of addition has been completed in important situations. Many of the original fears of taxpayers have been dispelled, and most of them are disposed to accept T.D. 4422 as a reasonable interpretation of the law.

In too many cases the analysis of fixed assets has not been carried far enough: insufficient sub-classification; too many composite rates; not enough unit control. Why not finish the job properly? Whether it be done manually, by machine or by punched card depends upon the volume of detail and the related adaptability of machine equipment. One thing is sure: accurate costs and reliable budgets usually demand unit controls of equipment and plant. For the purpose of interpreting the history of equipment as an aid to forecasting life expectancy, the control of maintenance, replacements, and depreciation rates; in fact, for the control of the very existence and possession of assets purporting to belong to the business, unit control records are essential. The more detailed and accurate the fixed asset records are, the more reliable will they be for the equitable adjustment of insured risks. There is often a suspicion that too much, rather than too little, insurance is carried. Proper plant records provide an excellent means of excluding those items that do not require coverage or are otherwise uninsurable.

It is unnecessary to take you through the forms and processes of establishing detailed plant records. They do not differ essentially from the types of records maintained in connection with perpetual inventories. If you want a fine demonstration, refer to the 1936 Year Book of the Association, and read the case study presented by Jack DeVitt at the Cincinnati Convention.[1]

Some Observations Concerning Depreciation

Appraisal engineers repeatedly make the statement that there are entirely too many companies in which no attempt is made to check the physical existence of plant and equipment from time to time; too many others in which the retirement, replacement, and/or major rehabilitation of machinery are loosely and inconsistently handled. Inadequate and unreliable reporting between the operating and accounting divisions result in lack of control of these expenditures. Each of us, drawing upon our own experience, would probably be loath to challenge the merit of this accusation.

There is also an insidious lack of accuracy in the too preva-

[1] John H. DeVitt. "Accounting Procedure for Capital Assets and Depreciation." *N. A. C. A. Year Book—1936.* pp. 139-60.

lent use of composite depreciation rates. Let us not overlook the prudent economy of shortcuts (of which composite depreciation rates are typical) to avoid spending a dollar to save a dime, but let us not follow the course of least resistance blindly, on the basis of a hasty conclusion that the effort and expense are not justified. Average rates may be applicable and expedient in the case of properly classified equipment, but there are many glaring examples of the inappropriate use of such average rates; the foundation, the machine proper, and directly attached motor equipment are many times covered by an average rate applied to all equipment of that character. There are types of equipment which have a long life, with the exception of some important part which requires periodic replacement. Take the case of certain types of furnaces, ovens, boilers, etc., which may require periodic relining every two, three, four, or five years. Such linings should be separately classified, and should be amortized over the brief period, creating a reserve against which replacements may be charged when made, rather than using a composite rate, and distorting operations by charges for extraordinary maintenance at irregular intervals. The control afforded by detailed plant records provides the basis for illuminating studies of these and analogous phases of fixed asset usage. Where average rates are used there is also the possibility that substantial additions made at irregular intervals incident to expansion of facilities, may necessitate a reweighting of the average rate to maintain a semblance of accuracy.

In connection with T.D. 4422, reference has been made to retirement losses. The use of an average naturally contemplates that a group of machines having an expected life of twenty years will include some units that will last less than that period and others that will last longer. The attitude of the Department in denying retirement losses under such circumstances is, therefore, entirely reasonable.

I do not intend to discuss the various methods of providing for depreciation: the straight line, reducing balance, sinking fund and annuity calculations. Straight line methods of depreciation are most generally in use. The production method is merely an adaptation of the straight line method, which adjusts the charge-off in relation to the units of production. From the standpoint

of cost accounting the production unit method is usually ideal, but from the financial point of view it has certain latent weaknesses, which might result in substantial error. Use is not the only controlling factor of depreciation. There is an element of physical deterioration during idleness, and the elusive factors of obsolescence and inadequacy. Even when physical equipment is subjected to the tests of observed depreciation, the matter of obsolescence remains an enigma, the character of which may change almost overnight. In the final analysis, depreciation rates are estimates. But just as in all other matters of accounting, the opinion and judgment applied may be immature, haphazard, and whimsical, or it may be based upon the conscientious application of scientific knowledge and research.

The determination of depreciation rates is not a matter of "rule-of-thumb" but one of considered judgment by those qualified to express opinions on such matters. If one could rely upon the good fortune of fairly normal production, sufficient over a period of years to consume the full utilization of a machine, the production method would be beyond reproach. Particularly in these days, there is such an element of clairvoyance in the forecast of productive units, that the production method of depreciation needs to be checked by straight line calculations or observed depreciation to assure the adequacy of the accumulated reserve, and to provide the proper division of the full depreciation charge between that allocated to production costs and that which becomes a financial charge in respect of idle or only partially active facilities. There are a number of methods of displaying the material facts in the statement of operations, which may vary with the character of the business.

In the past, major adjustments of capital values and reserves for depreciation have been necessitated by fallacious accounting for fixed assets and depreciation, in some cases, because of a careless disregard for the importance of the question, and in others, by what hindsight would term poor business judgment. It is important to realize that hindsight brings with it an intolerant wisdom. Many practices pursued in the past had the support of common acceptance, faulty though they may have been. But we should all be willing to profit by the experience of the past. No doubt, in due course, we shall have a resurge of optimism leading to the over-

expansion of facilities and imprudent capital structure as in the twenties, but this again will involve finely balanced questions of business judgment. Errors of judgment which occur in spite of the application of the best available scientific data and economic statistics certainly are far less blameworthy than those which occur from willful ignorance.

Financial Reporting

The importance of sound financial reporting may well be stressed. Increasing emphasis is being placed upon the statement of operations of a business rather than upon the balance sheet. The statement of operations measures the earning power of the resources of the business, and without such earning power the book amounts of many assets may represent doubtful value. It is essential, therefore, that sound principles of accounting be applied in the preparation of financial statements. These sound principles may find varied application in different businesses, but it is also essential that the application of these principles be consistently adhered to.

Consistency in the method of stating the accounts from year to year is the prime requirement. This does not mean that changes in accounting procedure may not be fully justified, but such changes must not be capricious and should be supported by some sound reason. Changes in technology, in marketing methods, and other similar causes may necessitate revisions in accounting. When these occur, the financial statements should outline the character of the changes made, the effect upon the determination of profit and loss, and the reason underlying such changes. Thus, a serious study of the plant and equipment accounts, the creation of plant records, appraisal to determine observed depreciation, and resulting changes in depreciation reserves and rates are subjects calling for adequate disclosure in the financial statements. What should be done with such adjustments?

Depreciation is an unavoidable element of profit and loss. The investment in fixed assets is expected to be recouped through operations over the useful life of the assets, and if consistently pursued, such investment will ultimately be charged to earned surplus through the annual depreciation included in profit and loss transferred to earned surplus. Assuming that the adjustments under

consideration relate wholly to corrections of prior years' charges for depreciation, it follows that such corrections must ultimately lodge in earned surplus, either by means of direct charges described as adjustments relating to operations of prior years, or by inclusion in extraordinary charges in the current profit and loss statement, separately displayed and similarly described.

Recurring charges and credits directly to surplus should be resisted, and small adjustments should, without question, be carried through the current profit and loss statement, properly disclosed. There are two opposing schools of thought concerning major adjustments: the one insisting that all such items should enter surplus by way of the statement of current profit and loss, adequately described, the other maintaining that such adjustments should go directly to surplus. Our own Past President, Tom Sanders, is of the latter school, and Howard Greer is an enthusiastic member of the former group. Among both public and private accountants, many ardent supporters of either side of the question may be found. The important aspect of the subject relates to the fact that capital surplus, as distinguished from earned surplus, should not be availed of to relieve earnings of charges which would normally fall thereagainst. Certainly, capital surplus should not be used in connection with these adjustments of depreciation. Whether the adjustments be made through current operations or directly against earned surplus is a purely academic question to me; tweedle-dee or tweedle-dum, if the adjustment is a major one and not recurring. I view surplus adjustments with disfavor, but there are occasions when these adjustments must be made, and I think it is utterly immaterial whether they go to profit and loss or to earned surplus. In fact, I prefer the surplus adjustment under such circumstances.

Departure from the Conventional "Cost" Basis

An outline of the phases of the subject selected for this presentation would not be complete without some reference to the exceptional circumstances under which there is ample justification for a departure from the academic ideal of stating the investment in fixed assets basically at cost of acquisition. There was a time during the war-profits days which involved "invested capital," and during the prosperous "Twenties" when the appreciation of fixed

assets came into vogue. In the former case, it involved the statement of invested capital at fair values at March 1, 1913, and in the latter, the application of the same idea to fair values during the era of rising price levels.

There were numerous instances of appraisals being made the basis for the issuance of prior-lien securities, in which it may well be argued that the display of such appraised values in the balance sheet was requisite to a proper disclosure of material facts. The practice has fallen somewhat into disrepute, largely by reason of abuse of the practice through reliance upon sound reproductive cost in excess of fair utilization value. After the crash, the opposite situation prevailed in many industries burdened with excess facilities and plants acquired at the peak of price levels. In some cases this condition has not yet been cured. Should management remain impotent in the face of these conditions and sink deeper and deeper into the mire of mounting losses? Or should management and stockholders face the facts squarely, take the loss on fixed assets, and adjust book amounts to a basis which may permit profitable operation on the remaining capital? To me, the answer is obvious. The only hope of revival lies in an adjustment of fixed assets to a basis commensurate with potential operations. Again I ask the question referred to earlier in this discussion. At what cost of acquisition could the business pay a fair return? May I add the questions: What markets are available to the company? What volume could be obtained? What details of production costs and operating expense can this volume bear to show a reasonable return on a hypothetical investment?

The aforementioned questions indicate that the problem should be attacked from the standpoint of sound operating and financial budgets, interpreted in terms of physical equipment and related values required to effectuate such a budget. This involves adjustments eliminating obsolete and excess facilities, the reduction thereof to nominal or scrap value, and the revision of active plant amounts to what may be termed "utility value." All of this must be done prudently, on the basis of competent engineering appraisal, starting *not* with the evaluation of existing facilities on the basis of sound reproduction cost, but rather upon a determination of the existing facilities which may be useful under the new setup, and ascribing a utilization value thereto.

There are many abortive accounting procedures involved in this process. The conflicting legal and equitable rights of stockholders, bondholders, and creditors usually inhibit action by management without stockholders' approval. Suffice it to say that ways and means of reconciling these conflicting interests may be found, and are found in recapitalizations and reorganizations which are consummated every day. The approach to the problem suggested reflects the thoroughly practical attitude of those who are about to purchase a business, and apply with equal force to the measure ment of the prospects of a reorganized business. Whether that reorganization is effected by means of 77B, voluntary reorganization, or "bloodless" revamping of a continuing company, is relatively immaterial for the purpose of this discussion. The accounting adjustments usually entail a scaling down of capital stock to create capital surplus; the elimination of operating deficits by charge against such capital surplus; the reduction of fixed asset amounts by charge against such capital surplus; and a fresh start in earned surplus thereafter, such earned surplus to be dated from the time of the reorganization. In these cases where sufficient earned surplus exists to absorb the plant reduction, the charge should be made thereagainst and not against capital surplus. The consensus of opinion among accountants, investment bankers and the S.E.C. is that such charges should not be carried to capital surplus, leaving earned surplus untouched and relieving future earnings of the charges for depreciation which would normally fall thereagainst.

After such a reorganization, obviously, fixed assets should be described as appraised by X.Y.Z. at a stated date, and the basis of the appraisal should also be described in an accompanying footnote to the balance sheet. Certainly the amount cannot be described as "cost."

Conclusion

In conclusion, it should be urged that the maintenance of fully detailed plant and equipment records affords the only practical basis for an intelligent picture of the many factors affecting these accounts which play such a vital part in the determination of the operating policies of business.

OBSOLESCENCE IN THE ELECTRIC LAMP INDUSTRY

By John S. Learoyd, Jr., Assistant Treasurer,
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OBSOLESCENCE respects neither time nor place, and has never heard of the word "precedent." It is one of a group of unpredictable items for which one must make provision in the accounts. While all industry is faced with the problem to some extent, for certain portions of industry it is of great magnitude. From its very beginning in 1901, the Hygrade Sylvania Corporation, in the electrical manufacturing field, has found obsolescence to be a large and important factor in cost determination, the control of fixed assets, and as an element to be considered in financial policy. At the outset the company developed certain techniques and methods to provide for it which have been employed successfully up to the present time. This paper attempts to outline the kinds and causes of obsolescence and to describe the procedure that Hygrade follows in handling it.

The Hygrade Sylvania Corporation manufactures electric lamp bulbs and radio receiving tubes. The present discussion will be largely limited to this industry; illustrations used will be drawn from the company's experience. At the same time, it should be realized that wherever obsolescence appears, it brings up the same general problems.

Types and Causes of Obsolescence

There are three principal types of obsolescence which the lighting industry has experienced within recent years: first, industry obsolescence in which a product is developed using entirely new principles for satisfying a need, thus rendering the old product and the old methods obsolete; second, product obsolescence arising from changes in the product within the same industry due to engineering advances; third, obsolescence arising from improved methods of manufacturing.

Industry Obsolescence

The history of lighting in the United States offers an excellent example of industry obsolescence. In the early years of this

country, light was obtained from lamps burning fat or whale oil. Consequently, there was a large and thriving whaling industry built up to supply the demand of the lighting market for oil. Presently, petroleum was discovered in Pennsylvania and lamps using kerosene for fuel became general. The new kerosene lamps were so much more satisfactory and gave so much more light that whale oil lighting became obsolete and disappeared. The obsolescence of the whaling industry was due to the discovery of a new product put out by another industry which displaced the earlier one.

The kerosene lighting industry was in turn displaced, in cities at least, where manufactured gas was available, by gas lighting, which had great advantages over kerosene. Still later, the invention of the incandescent electric lamp with its superiority over all previous methods of furnishing light, doomed the gas lighting industry.

Of course the displacement of one industry by another manufacturing a new and better product is a gradual process in most cases. The discovery or new invention may come over night, but a considerable period is bound to elapse before the new product can entirely eliminate the market for the old. Thus kerosene lamps were used in rural sections when gas lighting had become general in cities. Even today, with electric lamps as widespread as they are, kerosene is still used in many sections of the country. The obsolete industry, instead of being able to look forward to a widening and increasing market, is faced with a gradually dwindling demand which will ultimately be entirely eliminated.

Product Obsolescence

Examination of the history of the electric lighting industry itself gives excellent examples of product obsolescence, or obsolescence within the same industry due to improvements in the product. The first electric lamps were the old style carbon filament bulbs. They were largely made by hand, and, judged by present-day standards, were not very efficient. Some time later, the so-called "squirted" tungsten filament lamp appeared on the market. This filament was extremely fragile, but the lamp was a much more efficient light producer than the carbon filament bulb, and its manufacture made necessary new equipment which had never existed before, as well as changes in equipment employed in

the manufacture of the old bulbs. Still later a process was discovered whereby metallic tungsten could be drawn into wire suitable for electric lamp filaments. This discovery rendered existing equipment obsolete and required more new equipment. These changes are examples of obsolescence because of technical progress in the same industry.

While not as important a source of product obsolescence in the lamp and radio tube industry as improvements due to technical progress, style is nevertheless a large factor to be considered in some industries. Even in the case of lamps, style changes in the shapes of bulbs and in the development of the large assortment of colors now available, have made contributions to the obsolescence of manufacturing equipment. An outstanding example of the effect of style is given by the annual models of the automobile industry.

Obsolescence Due to Improvements in Manufacturing Methods

Examples of obsolescence due to improvements in the methods of manufacture have been numerous in the lamp industry. At one time lamp bulbs were manufactured by the usual departmental method, each department completing one operation and the finished parts passing on to the next department. This method of manufacture was improved by the application of the production line idea. Instead of the plant's being divided into departments, each of which was made up of a group of like machines performing the same operation, the equipment was rearranged into a number of production lines which took the lamp assembly through the sequence of operations necessary for completion. Thus, several operators sat at a table; the parts were passed from one operator to the next, and the last operator had a finished lamp which she packed in a shipping case. In this rearrangement, each operator used the same type of machine that she had used in her former department, but many of the machines had to be redesigned to fit into the smaller space available. Therefore, much of the old departmental equipment was obsolete and had to be discarded.

As a result of this change, the several parts of the lamp were delivered at one end of the table, and the finished lamps, all packed, were taken away at the other end. The consequent improvement had real manufacturing advantages. There was much less glass

breakage, and when the day's work was over there was nothing in the factory but raw material and finished lamps. All the process material formerly left between departments at night had been eliminated.

Causes

The prime cause of all three types of obsolescence may be traced to engineering developments. A new idea is just as likely to come from a young man on a farm as from the expensive research laboratory of a large corporation. Revolutionary, original ideas, such as would cause industry obsolescence, usually spring from inspiration, and there is no way of foretelling when they will appear or who will be affected by them. However, methodical, persistent research gradually produces results which may well cause obsolescence in products or in methods of manufacture. While it is not easy to predict the appearance or the effects of technical advances from such research, it is possible to evaluate to some extent the possibilities of the near future, because of the control and supervision exercised over these activities.

Organized engineering research is usually directed at some objective. It may be aimed at widening the market through sales research, at improving the quality or uniformity of the product, or at the development of new products which may be better. All these aims, if reached, cause product obsolescence. Engineering research for the purpose of obtaining lower costs through more automatic or improved equipment results in changed methods of manufacture which may also cause a better and more uniform product.

Purpose of Accounting for Obsolescence

This factor of obsolescence is not unique to the lamp industry of the United States, but applies at a more or less rapid rate in almost every industry. It therefore becomes essential to estimate the rate of obsolescence and to reflect properly its effect in the accounts. To neglect to account for obsolescence, especially where it is a large and important item, would result in serious errors in the financial statements, would make statistical information about the business unsatisfactory as a guide to administrative decisions, and would practically prevent the management from establishing a sound financial policy.

Obsolescence is certainly a cost of doing business that must be included if the profit and loss statement is to represent actual operating results. Not only must it be included, but because of the annual accounting period the estimated annual obsolescence charge must be as correct as possible or the profits between years will be distorted. Thus, too large an estimate will understate profits in the early years and overstate them in subsequent years when the equipment has been completely charged off, but is still being used. Too small an annual obsolescence charge has a converse effect upon the profits. If the annual obsolescence charge is adequate, the equipment will be written off at retirement time and therefore the company will avoid losses.

The importance to the balance sheet of a proper policy of accounting for obsolescence is evident. The balance sheet is supposed to present, among other things, the best asset valuations possible. Good judgment, based upon all the facts available, must be used in determining the depreciation and obsolescence charge to be applied against the original book values of the fixed assets. Accurate costs, so essential in setting intelligent selling prices and in measuring and controlling operating performance, must, of course, include a proper obsolescence charge.

In industries where obsolescence is rapid, it imposes a further duty upon the treasurer. Its importance as an element to be considered in financial policy is evident. The treasurer must always be ready to replace part of the equipment within a comparatively short time, and he must have funds available for this purpose. It is sufficient in most cases to keep the company in a strong current position so that liquid assets are adequate to purchase new equipment. The treasurer certainly cannot make provision for obsolescence in his financial policy, unless he has a good estimate of what he may expect.

Failure to provide adequately for obsolescence in the financial policy is fraught with danger to a company over a period of years. Consider what might happen. A new type of equipment is developed which makes it possible to manufacture the product at lower cost. One company does not have funds available to buy the new equipment, but it is forced to meet the lower prices of its competitors. Profits dwindle, and there is no chance to accumulate enough funds to replace the obsolete, marginal machinery. As a

result a vicious spiral has developed; the company is ultimately forced out of business.

Having recognized the presence and importance of obsolescence, how shall one provide for it in the accounts and the general financial administration of a business?

Provision for Obsolescence

The Retirement Method

One possibility is the retirement method. Under this method the property is simply written off when replaced; no attempt is made to build up a reserve against the retirement of the property by means of a periodic obsolescence charge. In most cases, it seems that such a policy is based on the presupposition that obsolescence is not a current cost of doing business which is continually in operation; instead, it is an extraordinary loss which comes all at once when the property is discarded. If the amount is large, it is usually charged to surplus, while if small, to current expenses. Where the amounts written off do not vary substantially from year to year, this policy does not distort the profits. Nevertheless, the balance sheet valuations fail to reflect the growing obsolescence of the property; the result is overvaluation of the plant and equipment. Furthermore, in most cases the amount of property discarded each year varies considerably, with consequent distortion of profits between years. A further difficulty is that the successful financial administration of a business requires that a certain portion of yearly revenue be retained to purchase new equipment, as mentioned above, and the pursuance of this policy, because it does not furnish any estimate of a suitable annual charge for obsolescence, provides no guide to the size of the portion that should be reserved.

The Accrual Method

A second possibility is the accrual method, in which a yearly obsolescence charge is derived from a consideration of all the facts obtainable. The accrual method eliminates the difficulties of the retirement method since it results in better profit figures and balance sheet valuations, and aids in establishing a sound financial policy. In the vast majority of companies, the accrual method is used, and rightly so. It is hard to see how the retirement method

can give satisfactory results except in special circumstances—for example, where there are a large number of identical units being replaced at a constant rate per year at uniform cost.

In following the accrual method a large number of variations in procedure are possible in arriving at the annual charge. Each company has to be governed in its selection by the conditions of the situation that it must meet. No matter how complex and painstaking the procedure may be, the final result is an estimate. All that can be expected is that the estimate is obtained through the application of good judgment to the facts in hand, and that it will coincide with actual developments as closely as possible.

The Feasibility of Separation of Depreciation and Obsolescence

Considerable discussion has arisen as to whether depreciation and obsolescence should be provided for separately or together. If depreciation, in its broadest sense, is the loss in service life, it comprises the effects of both physical actions and technological advances, or obsolescence. The general argument for separating them rests on the concept of physical wear and tear as a more or less predictable cost, and of technological advances as an indefinite contingency. While it is certainly true that the latter is much harder to evaluate in advance, when it strikes its effect in decreasing service value is assuredly an added cost of having operated the plant and equipment. It follows that whether separated or combined, some provision must be made for both. As long as a composite rate can be developed on the basis of careful estimates that will take care of both, there is no real advantage in a separation.

Three Main Elements of the Accrual Method

The accrual method involves three main elements: First, the depreciable unit must be selected. This unit may be all the equipment lumped together, a group of equipment of the same type, or an individual machine. Second, some value which is to be recovered through the annual depreciation charge must be attached to the unit. The two major alternatives are original cost and reproduction cost. Third, a rate must be figured on some basis which will give a satisfactory annual depreciation charge when applied to the value decided upon. The straight-line and production bases are the two most important.

The Depreciable Unit

If all the equipment is selected as the depreciable unit, one uniform rate is used, of course, regardless of the varying lives of the individual pieces which are included. Herein lies a difficulty with this depreciable unit; it is not an easy matter to estimate the composite life of a miscellaneous assortment of equipment. The use of a group of like machines, which rests upon the theory of the average life of identical units in a group, or of an individual machine as a depreciable unit, makes the problem of estimating the life upon which to base the rate very much simpler. It is evident, though, that either of these two methods involves more clerical work in the accounting routine than the first method. In situations where obsolescence is a large and dominant factor in the depreciation charge, all the equipment is apt to have the same economic life regardless of the varying physical lives of the separate pieces; hence, by lumping it all into one depreciable unit, satisfactory results may be obtained.

Bases of Valuation

The original cost and reproduction cost bases of valuing the depreciable unit are based on diametrically opposite concepts of the purpose of the depreciation charge. The original cost basis is predicated upon the idea that the original outlay in acquiring an asset is a part of the cost of the units which are benefited by that asset in manufacture. In other words, when one buys a machine, he expects to convert that machine into the product through the service that it gives in operation. Therefore, the depreciation charge is for the sole purpose of recovering the original outlay and of preventing dissipation of the assets. The reproduction cost basis, on the other hand, rests upon the assumption that the cost aspect can be neglected; the depreciation charge only serves to build up a reserve so that new equipment can be purchased when the present equipment is discarded. Hence, the amount of the reserve should be governed solely by the cost of the new equipment.

The cost of reproduction basis is inconsistent with a correct concept of cost. The depreciation portion of the cost of a particular product is not a pro rata share of the cost of a replacement

machine, which is the result given by the use of this basis, but it is a pro rata share of the cost of the machine upon which the product is processed. Hence, the cost basis is certainly preferable on this account. A further difficulty with reproduction cost is that it is constantly fluctuating. The rate used is therefore in need of constant revision for a strict application of this basis. The problems involved are apparent.

Methods of Determining the Rate

In addition to the straight-line method and the production method of determining the rate, there are a number of more theoretical methods which bring in the problem of annuities, sinking funds, and compound interest. However, since the whole problem is one of estimating, the extra mathematical accuracy of these refined methods is not warranted. If wear and tear is the dominant part of the rate, there is doubtless much to be said for the production basis. However, where obsolescence is the important factor, the straight-line basis is more desirable, since obsolescence is a function of time and not of production. In addition, there is much in the way of simplicity to commend the straight-line method.

Practice of the Hygrade Sylvania Corporation

Determination of the Depreciable Unit

The Hygrade Sylvania Corporation has its equipment divided into various classes, in only two of which obsolescence is a factor —lamp manufacturing machinery and radio tube manufacturing machinery. These two classifications include all the machinery and equipment used directly in the manufacture of lamps and radio tubes.

There are subsidiary records of individual machines or groups of like machines; these subsidiary records are established wherever there is an appreciable amount of money involved. A depreciation rate is determined for the classification "Lamp Manufacturing Machinery," and another rate for the "Tube Manufacturing Machinery." If it appears that a machine, or a group of machines, is to become obsolete, the subsidiary records are used in

order to determine the undepreciated balance which must be charged off.

Determination of the Rate

Hygrade uses one rate for both depreciation and obsolescence. In other words, the company makes no attempt to separate wear and tear from loss in usefulness due to new developments. The management feels that there is no advantage in such a separation. Therefore, in the following discussion of the company's procedure, depreciation includes obsolescence, even though obsolescence has been a greater cause of retirement of equipment than wear and tear in Hygrade's experience. The rate is based upon original cost.

When new equipment is purchased, its life is estimated and the initial rate derived on the straight-line basis. New equipment is added to the asset accounts monthly as received, and the monthly depreciation charge is based on the asset balances at the close of the preceding month. Whenever there is a decision to be made between two possible rates, the larger one is always chosen for safety's sake.

Periodic Examination

At the beginning of every year, there is a thorough and detailed examination of all equipment, and present estimates of life are checked with the most recent developments. This investigation involves a careful study of all sources of obsolescence. Consideration is given to other methods of producing light, to see if any other products offering light are being sold to the public, and whether or not there is a possibility that these products will replace the lamp bulbs being used at the present time. For example, when the neon lamps, so widely used for advertising purposes, first appeared on the market they were considered in this respect. The Hygrade Sylvania Corporation's engineers report not only on their own developments, but on everything which they have been able to find out through their memberships in technical societies, technical publications, or from any other sources. The methods of manufacture are reviewed. Equipment manufacturers are visited to find out about any new equipment offered for sale or in the

process of design, and any ideas which equipment manufacturers may have although they have not yet put them down on paper.

Adjustment of the Rate

When the examination has been completed, where the life expectancies have changed, new rates are developed to be used until the next investigation. In the middle of each year, or six months after the annual examination, the results are reviewed.

When equipment is found to be obsolete, the balance is written off during the period that will elapse before the new equipment is ready for installation. The experience of the Hygrade Sylvania Corporation in the case of the change in manufacturing method, referred to previously, illustrates the company's procedure with regard to obsolescence.

All of the equipment to be discarded was in the classification "Lamp Manufacturing Machinery." The original cost of this equipment was $100,000. Total depreciation reserve was $60,000, based upon an annual rate of 25 per cent. The machinery had been depreciated for about two and one-third years. It was estimated that the new equipment would be ready for installation in about fifteen months. The undepreciated balance of $40,000 was written off within this time, which necessitated a monthly charge of $2,666.

Conclusion

The above procedure has worked successfully for Hygrade Sylvania Corporation for many years. The mechanics of the method are not important. However, it is important to examine thoroughly the situation in regard to obsolescence at regular intervals. With such an unpredictable item to be accounted for, a company must endeavor to keep abreast of developments or it will at some time be caught in an unfortunate condition. The best judgment possible must be used in evaluating these developments and in estimating their effect upon the company.